

CLAIMS

What is claimed is:

1. A method of reverse link power control at a mobile station comprising:
transmitting a pilot signal at a controlled transmit power;
transmitting one or more traffic channel signals at one or more power gains
directly or indirectly relative to the transmit power of the pilot signal; and
adjusting the power gain of one or more of the traffic channel signals responsive
to receiving reception quality feedback from one or more remote
transceivers for the one or more traffic channel signals.
2. The method of claim 1, wherein transmitting one or more traffic channel signals
at one or more power gains relative to the transmit power of the pilot signal comprises
transmitting a first traffic channel signal at a first power gain relative to the pilot signal,
and transmitting a second traffic channel signal at a second power gain relative to the
first traffic channel signal.
3. The method of claim 2, further comprising setting the second power gain
responsive to receiving reception quality feedback for the second traffic channel signal
such that the transmit power of the second traffic channel signal relative to the transmit
power of the first traffic channel signal varies as a function of the reception quality
feedback received by the mobile station for the second traffic channel signal.
4. The method of claim 3, further comprising maintaining the first traffic channel at a
fixed power gain relative to the pilot signal.

5. The method of claim 1, wherein adjusting the power gain of one or more of the traffic channel signals responsive to receiving reception quality feedback from one or more remote transceivers for the one or more traffic channel signals comprises receiving reception quality feedback for at least one traffic channel signal and adjusting the power gain of that traffic channel signal relative to the transmit power of the pilot signal, or relative to a transmit power of another traffic channel signal that is transmitted with a power gain relative to the transmit power of the pilot signal.

6. The method of claim 1, wherein transmitting a pilot signal at a controlled transmit power comprises adjusting a transmit power of the pilot signal responsive to power control commands received by the mobile station from one or more network base stations.

7. The method of claim 1, wherein the mobile station receives reception quality feedback for a given one of the one or more traffic channel signals as good and bad reception indicators that indicate good or bad reception by one or more network base stations.

8. The method of claim 7, wherein the mobile station adjusts the power gain of the given traffic channel signal by decreasing the power gain responsive to receiving one or more good reception indicators, and increases the power gain responsive to receiving one or more bad reception indicators.

9. The method of claim 7, wherein the good and bad reception indicators comprise ACKs and NAKs, respectively, and wherein the mobile station adjusts the power gain of the given traffic channel signal by decreasing the power gain responsive to receiving one or more ACKs and increasing the power gain responsive to receiving one or more NAKs.

10. The method of claim 9, wherein the mobile station increases the power gain for the given traffic channel signal by a first step size responsive to receiving a NAK.

11. The method of claim 10, wherein the mobile station decreases the power gain for the given traffic channel signal by a second, smaller step size responsive to receiving an ACK.

12. The method of claim 11, further comprising calculating the second step size as a function of the first step size and a Frame Error Rate (FER) determined from the ACK/NAK feedback.

13. The method of claim 1, wherein the reception quality feedback comprises one or more of ACK/NAK feedback, quality indication feedback, and erasure indication feedback.

14. A mobile station comprising:

transceiver circuits configured to transmit and receive signals to and from a wireless communication network, said signals including a pilot signal transmitted from the mobile station at a controlled transmit power and one or more traffic channel signals transmitted at one or more power gains directly or indirectly relative to the transmit power of the pilot signal; and one or more processing circuits operatively associated with the transceiver circuits, said one or more processing circuits including a power control circuit configured to adjust the power gains of one or more of the traffic channel signals responsive to receiving reception quality feedback from one or more remote transceivers, such that relative transmit powers of one or more traffic channels transmitted by the mobile station vary as a function of receiving the reception quality feedback.

15. The mobile station of claim 14, wherein the mobile station is configured to transmit a first traffic channel signal at a first power gain relative to the pilot signal, and transmit a second traffic channel signal at a second power gain relative to the first traffic channel signal.

16. The mobile station of claim 15, wherein the mobile station is configured to set the power gain of the second traffic channel signal responsive to receiving reception error information for the second traffic channel signal such that the transmit power of the second traffic channel signal relative to the transmit power of the first traffic channel signal varies as a function of the reception quality feedback received by the mobile station for the second traffic channel signal.

17. The mobile station of claim 16, wherein the mobile station is configured to maintain the first traffic channel at a fixed power gain relative to the pilot signal.
18. The mobile station of claim 14, wherein the mobile station is configured to receive reception quality feedback for at least one traffic channel signal and adjust the power gain of that traffic channel signal relative to the transmit power of the pilot signal, or relative to a transmit power of the other traffic channel signal that is transmitted with a power gain relative to the transmit power of the pilot signal.
19. The mobile station of claim 14, wherein the mobile station is configured to adjust the transmit power of the pilot signal responsive to power control commands received by the mobile station from one or more network base stations.
20. The mobile station of claim 14, wherein the reception quality feedback comprises good and bad reception indicators, and wherein the mobile station is configured to adjust the power gain for a given traffic channel signal by decreasing the power gain responsive to receiving one or more good reception indicators and increasing the power gain responsive to receiving one or more bad reception indicators.
21. The mobile station of claim 20, wherein the mobile station is configured to increase the power gain for the given traffic channel signal by a first step size responsive to receiving a bad reception indicator.

22. The mobile station of claim 21, wherein the mobile station is configured to decrease the power gain for the given traffic channel signal by a second, smaller step size responsive to receiving a good reception indicator.

23. The mobile station of claim 22, further wherein the mobile station is configured to calculate the second step size as a function of the first step size and a Frame Error Rate (FER) determined from the reception quality feedback.

24. The mobile station of claim 22, wherein the mobile station is configured to receive the reception quality feedback as good and bad reception indicators comprising one or more of ACK/NAK indicators, quality bit indicators, and erasure bit indicators.

25. A method of data link power control at a communication transceiver comprising:
controlling a transmit power of a first signal transmitted by the communication
transceiver responsive to one or more received power control commands;
transmitting a second signal at an adjustable transmit power having a power gain
relative to the transmit power of the first signal;
receiving reception quality information relating to the second signal; and
adjusting the power gain of the second signal responsive to the reception quality
feedback.
26. The method of claim 25, wherein transmitting a second signal at an adjustable
transmit power having a power gain relative to the transmit power of the first signal
comprises setting its transmit power for the second signal as a function of the transmit
power of first signal and the power gain, and wherein the transceiver adjusts that power
gain up and down as needed responsive to receiving reception quality feedback for the
second signal from a remote transceiver receiving the second signal.
27. The method of claim 25, further comprising transmitting a third signal having a
power gain relative to the transmit power of the first signal, and setting the power gain of
the second signal relative to the third signal.
28. The method of claim 27, wherein adjusting the power gain of the second signal
responsive to the reception quality feedback comprises adjusting the power gain of the
second signal relative to the first and third signals such that power ratios of the first and
third signals to the second signal change as a function of reception quality feedback
received for the second signal.

29. The method of claim 28, further comprising adjusting an inner-loop power control target of the first signal based on a received signal quality of the third signal.

30. The method of claim 28, wherein the first signal comprises a pilot signal, and the second and third signals comprise first and second traffic channels, respectively.

31. The method of claim 25, wherein controlling a transmit power of a first signal transmitted by the communication transceiver responsive to received power control commands comprises transmitting a pilot signal and adjusting the transmit power of the pilot signal responsive to the received power control commands, and wherein transmitting a second signal at an adjustable transmit power having a power gain relative to the transmit power of the first signal comprises transmitting a data signal at a transmit power determined by the transmit power of the pilot signal and the power gain.

32. The method of claim 31, wherein receiving reception quality feedback relating to the second signal comprises receiving good and bad reception indicators that indicate whether a remote transceiver correctly received data carried by the data signal.

33. The method of claim 32, wherein receiving good and bad reception indicators that indicate whether a remote transceiver correctly received data carried by the data signal comprises receiving ACK/NAK indications from the remote transceiver for each frame of the data signal, and wherein adjusting the power gain of the second signal relative to the first signal responsive to the reception quality feedback comprises increasing the power gain by a first amount responsive to receiving a NAK and decreasing the power gain by a second amount responsive to receiving an ACK.

34. The method of claim 25, wherein the communication transceiver comprises a mobile station, the first signal comprises a pilot signal, and the second signal comprises a traffic channel signal, and wherein controlling a transmit power of a first signal transmitted by the communication receiver responsive to received power control commands comprises controlling the transmit power of the pilot signal responsive to power control commands transmitted to the mobile station by one or more network base stations.

35. The method of claim 34, wherein transmitting a second signal at a controlled power gain relative to the first signal comprises transmitting data frames on the traffic channel signal, and wherein receiving reception quality feedback relating to the second signal comprises receiving reception quality feedback from one or more network base stations on a per frame basis.

36. The method of claim 35, wherein the reception quality feedback comprises ACK/NAK indicator feedback, and wherein adjusting the power gain of the second signal relative to the first signal responsive to the reception quality feedback comprises increasing the power gain as a function of receiving NAK indications and decreasing the power gain as a function of receiving ACK indications.

37. The method of claim 25, wherein the communication transceiver comprises a network base station in a wireless communication network.

38. The method of claim 25, wherein receiving reception quality feedback relating to the second signal comprises receiving one or more ACK/NAK feedback, quality indicator feedback, and erasure feedback.

39. A communication transceiver comprising:
- transceiver circuits to transmit and receive signals to and from one or more remote transceivers; and
- one or more processing circuits operatively associated with the transceiver circuits, said one or more processing circuits including a power control circuit configured to:
- control a transmit power of a first signal transmitted by the communication transceiver responsive to power control commands received by the communication transceiver;
 - control a power gain of a second signal transmitted by the communication transceiver directly or indirectly relative to the transmit power of the first signal; and
 - adjust the power gain of the second signal responsive to the reception quality feedback received by the communication transceiver for the second signal.
40. The communication transceiver of claim 39, wherein the communication transceiver transmits a third signal having a power gain relative to the transmit power of the first signal, and wherein the communication transceiver is configured to set the power gain of the second signal relative to the third signal.
41. The communication transceiver of claim 40, wherein the communication transceiver is configured to adjust the power gain of the second signal responsive to the reception quality feedback by adjusting the power gain of the second signal relative to the first and third signals such that power ratios of the first and third signals to the

second signal change as a function of reception quality feedback received for the second signal.

42. The communication transceiver of claim 41, wherein the communication transceiver is configured to adjust an inner-loop power control target of the first signal based on a received signal quality of the third signal.

43. The communication transceiver of claim 41, wherein the first signal comprises a pilot signal, and the second and third signals comprise first and second traffic channels, respectively.

44. The communication transceiver of claim 39, wherein the first signal comprises a pilot signal, and wherein the power control circuit is configured to adjust the transmit power of the pilot signal responsive to the power control commands.

45. The communication transceiver of claim 44, wherein the second signal comprises a data signal, and wherein the power control circuit is configured to control the power gain of the data signal relative to the pilot, such that a transmit power of the data signal depends on the transmit power of the pilot signal and the power gain.

46. The communication transceiver of claim 45, wherein the power control circuit is configured to adjust the power gain of the second signal relative to the first signal responsive to the reception quality feedback received by the communication transceiver for the second signal by receiving good and bad reception indicators indicating whether a remote transceiver correctly received data carried by the data signal.

47. The communication transceiver of claim 46, wherein the power control circuit is configured to increase the power gain by a first amount responsive to receiving a bad reception indicator and decrease the power gain by a second amount responsive to receiving a good reception indication.

48. The communication transceiver of claim 46, wherein the communication transceiver is configured to receive good and bad reception indicators as one or more of ACK/NAK feedback, quality indication feedback, and erasure indicator feedback.

49. The communication transceiver of claim 39, wherein the communication transceiver comprises a mobile station, and wherein the first signal comprises a pilot signal and the second signal comprises a traffic channel signal.

50. The communication transceiver of claim 49, wherein the mobile station is configured to transmit data frames on the traffic channel signal, and is configured to receive the power control commands and the reception quality feedback from one or more base stations of a wireless communication network that are supporting the mobile station.

51. The communication transceiver of claim 50, wherein the reception quality feedback comprises ACK/NAK feedback, and wherein the power control circuit is configured to increase the power gain of the traffic channel signal relative to the pilot signal by retransmitting a data frame for which a NAK was received by the mobile station according to a desired retry protocol, and increasing the power gain if the retransmission is unsuccessful.

52. The communication transceiver of claim 39, wherein the reception quality feedback comprises ACK/NAK feedback, and wherein the power control circuit is configured to increase the power gain as a function of receiving NAK indications and decrease the power gain as a function of receiving ACK indications.